

Reusing Contaminated, Dredged Sediments

Challenge

Each year, between 12 and 28 million cubic yards of contaminated sediments are dredged from US coastal waterways. Disposal of these sediments is a formidable management challenge. The goal of this project is to investigate the viability of using contaminated sediments in the manufacture of cement. This research examines the fate of contaminants used for cement as well as the overall performance of cement containing dredged sediments. If successful, the result will be an innovative management strategy suitable for adoption by the coastal community on a national scale.



Science

Approach

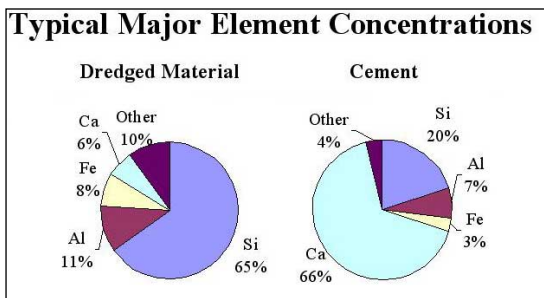
Foremost among the research objectives of this project are:

- characterize a range of dredged sediments in terms of their mineralogy and contaminant content
- assess the procedures that will be necessary to use dredged sediments in the manufacture of cement
- assess the economics of using dredged sediments in the manufacture of cement

Results

In general, the results show that it is both technically and economically viable to use dredged sediments as a component of cement. Specifically:

- sampled dredged material contained large quantities of silicon, iron and aluminum oxides, three of the four main ingredients in cement. Researchers estimate that as much as 12% of the raw materials for cement could be composed of dredged sediments.
- using contaminated dredged material in the manufacture of cement can actually lower the amount of heavy metals in the final product, because mined materials used for cement often contain more heavy metals than contaminated marine sediments.
- organic contaminants (e.g., PCBs, PAHs) are volatilized in the normal kiln firing process.



Application

Chloride Concerns

The high chloride content of marine sediments doesn't affect the final product, but it can lead to problematic scaling within the kilns. To avoid this, manufacturers would have to shut down and clean the system more often.

What About the Cost?

The Port Authority of New York/New Jersey (PANYNJ) commissioned an economic analysis of using contaminated sediments in cement manufacture. The analysis showed that it would cost them between \$15 and \$25 per cubic foot to prepare dredged material for cement manufacture: (Current options for dredged material disposal cost PANYNJ around \$55 per cubic yard at the minimum.)

Scaling Up

Because these results are system dependent, researchers are pursuing pilot and full-scale test opportunities in order to confirm the viability of this technology.

Project Essentials

Title: Development of Beneficial Use Alternatives for the Management of Dredged, Contaminated Sediments

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